coloured suns all over the northern provinces of South America; while between the 3rd and 4th of the same month the glows extended across the Pacific both north and south as far as the Society and Gilbert Islands, and were reported from two stations in New Britain.

By September 5 the Sandwich Islands were reached; while the outburst of glows in Southern India did not commence till about the 6th to 8th of the same month.

The northward extension of the dust all this time was very small, and not widespread. Isolated phenomena are reported from Formosa on August 26, and from Japan on the 28th, but I am unable to say whether the glows which appeared in the Sandwich Islands on September 5, had come *viâ* Japan, or across South America.

Thus the general system of the dust-flow appears to have been very simple. The great dust-stream was carried for the first twenty-four hours by the normal easterly upper currents over the south-east trade, at the extraordinary rate of more than 120 miles an hour, but hardly extended north of the line. Three days after the eruption we find the products of Krakatão in Guiana, the South Atlantic and also north of the line in the Cape Verd Islands. Just to the south of the latter we know that the south-east trade with its attendant upper currents crosses the equator. Then all the north of South America was invaded; and six or seven days after the first outburst, the Pacific Islands—south of, or on the line—were also overshadowed.

In fact we may say that the great stream of Krakatão dust was carried nearly round the world by the usual upper winds of the south-east trade, in which the dust was first ejected, at a rate of about 120 miles an hour, and that the dust spread very slowly either north or south of the main current.

There is one inference from this which is very important in any theory of the general circulation of the atmosphere from the equator to the Poles. The main body of the equatorial circulation is in an easterly direction, so that the whole mass of air going towards the doldrums does not rise up and flow backwards on itself directly towards the Pole; and though the highest currents over the Polar limit of both the south-east and north-east trades are from north-west and south-east respectively, still the poleward motion near the equator is very small.

The high velocity of 120 miles an hour is certainly more than would have been expected; but we have very few observations on the rate of motion of the highest clouds. Hildebrandsson has, however, reported from Upsala one velocity of about 112 miles per hour for a cirrus at 28,000 feet (50 metres per second at 8559 metres); and several velocities ranging between that figure and 90 miles per hour.

There would be nothing, then, outrageous in the assumption of a velocity of 120 miles an hour for the easterly current over the equator to account for the high speed of the diffusion of Krakatão dust; and it is also satisfactory to know that the general direction of the flow is in accordance with the most recent researches on the vertical succession of the upper currents near the equator. RALPH ABERCROMBY.

BERNARD STUDER.

AMONG the magnates of Swiss geology, no name has held a more honoured place than that of Bernard Studer, who now at the ripe age of ninety-three years has passed away. Upwards of sixty years ago he began his scientific career by the study of some of the geological problems presented by the rocks of his native country. From the molasse of the lower grounds he soon climbed into the higher Alps, and distinguished himself as one of the foremost pioneers who grappled with the intricate problems in stratigraphy which these mountains present. With patient toil he extended year by year his acquaintance with the various portions of the chain, publishing from time to time notices of his labours, and preparing materials for a geological map of the whole region. In association with A. Escher von der Linth he pursued these labours until the two fellow-workers were enabled to give to the world their great map of Switzerland, which, though only an outline of the geology of the Alps, will remain as an enduring monument of the geological prowess of its authors. No one who has not climbed the mountains with that map in hand can form any adequate conception of the physical labour, mental exertion, and happy geological intuition which its preparation required.

Studer's contributions to the glacial geology of the Alps brought him into intimate personal relations with many English geologists. All who passed through Berne tried to see the venerable Professor, who retained, in spite of his weight of years, his keen interest in the progress of his favourite science. His papers, published in various scientific journals, make a long list. But he was also the author of some separate works. Besides the great map of Switzerland, he published several volumes on Swiss geology, the most important of which was his "Geologie der Schweiz," which appeared in two volumes in 1851-53. Less known perhaps, but full of suggestive matter, is his "Lehrbuch der physikalischen Geographie und Geologie," which was issued as far back as 1844. This work was one of the earliest in which the processes of physical geography were discussed from the geological side, and showed how wide and thoughtful had been the observations of the author, especially among the phenomena to be witnessed in Switzerland. Another of the old lights of geology has been extinguished by the death of Bernard Studer, whose kindly presence and helpful courtesy will be affectionately remembered by everyone who has been fortunate enough to come in contact with him.

NOTES.

AN important Bill dealing with the question of technical education has been introduced into the House of Commons by Sir Henry Roscoe. The Bill empowers any School Board, local authority, or managers of a public elementary school, to provide day technical and commercial schools and classes for the purpose of giving instruction in any of certain subjects. These include the several science subjects which are specified in the Directory of the Science and Art Department, and in which that Department undertakes to examine. The following subjects are also included: the use of ordinary tools, commercial arithmetic, commercial geography, book-keeping, French, German, and other foreign languages, and freehand and machine drawing. The addition of other subjects may be sanctioned from time to time by the Committee of Council on Education or by the Science and Art Department. For the purpose of carrying on these schools and classes, the power of School Boards, other local authorities, and school managers is to be in every respect the same as for providing ordinary elementary schools. They are to have power to provide, or contribute to the maintenance of, laboratories and workshops in endowed schools for the purpose of carrying on classes or instruction under the Bill. All these schools and classes are to be subject to the inspection of the officers of the Committee of Education or of the Science and Art Department. Before a scholar is admitted he must have passed the Sixth Standard or some equivalent examination. The Education Committee and the Science and Art Department are authorized to give grants on such conditions as they may lay down for any of the subjects taught. For the purpose of obtaining grants a technical school or class must be one carried on under minutes to be made by the

Science and Art Department, and laid on the table of the House of Commons in the same way as the minutes that regulate the grants of the Education Department.

ON Tuesday afternoon the new Science and Art Schools which have been erected (at a cost of £17,000) in connexion with Sir Andrew Judde's School, Tunbridge, were formally opened by the Lord Mayor of London. Among those who addressed the company present at the ceremony was Prof. Judd, who referred to Mr. John Morley's idea that science is likely to retaliate on literature for the subservient position it has been so long compelled to occupy. All who had any authority to speak on behalf of science, said Prof. Judd, fully recognized the value of a true literary training, which taught men how best to express the thoughts arising from the trained mind, and the store of facts which science supplied. People must recognize, however, that the time had come when science must take her proper place in the education of the country; for if they did not, other nations would, to the destruction of all our pre-eminence.

ANOTHER serious loss has been inflicted on the cause of geology in this country by the death of Mr. Champernowne, of Dartington Hall, Totnes. Representative of an old Devonshire family, and living in the ancestral home, he was a country gentleman of the best type. At the same time, he devoted himself with singular ardour to geology and especially to the study of the complicated structure of the Devonian rocks of his own district. He had with his own hand mapped the subdivisions of these rocks in far ampler detail than had ever before been attempted, and with a skill and success worthy of the best-trained professional geologist. He lately generously presented his maps to the Geological Survey, with a view to the projected publication of a new edition of the Survey maps of the district. It was while engaged in revising some of his lines for this purpose that he aggravated a previous cold, and brought on congestion of the lungs, which carried him off after an illness of only a few days. His geological ardour was fully equalled by his courtesy and kindness, which endeared him to a wide circle of friends who mourn his early death.

PROF. VULPIAN, the eminent French physiologist, died of pneumonia on the 18th inst. He was sixty-one years of age. For some time he was Assistant Professor in the Museum of Natural History in Paris, but afterwards he was made Professor of Pathological Anatomy in the Paris Medical School. He was appointed Member of the Academy of Sciences in 1876, and Perpetual Secretary in 1886. His principal works relate to the vasomotor system, the diseases of the nervous system, the digestive process, and the physiological action of curare, strychnine, and some other drugs. Before the short illness of which he died, he was giving lectures on the respiratory function; and he was about to publish an important book on the cerebral functions. He was a most conscientious investigator, and his death is greatly regretted by French men of science. The funeral took place on Saturday last, and was attended by a large crowd of friends and students.

THE anniversary meeting of the Royal Geographical Society was held on Monday, when General R. Strachey, who has been elected President, delivered the annual address. After paying a high tribute to his predecessor, Lord Aberdare, and noticing the losses of the Society by death during the past year, General Strachey went on to speak on the subject of geographical education. He then reviewed the chief geographical events of the year, and traced the progress that has been made in geographical knowledge since the beginning of the Queen's reign.

AT the last meeting of the Council of University College, Liverpool, Mr. R. J. Harvey Gibson was appointed to the Lectureship of Botany, vacant by the resignation of Dr. Shearer.

MR. EDGAR M. CROOKSHANK, M.B. (Lond.), has been appointed Lecturer on Bacteriology by the Council of King's College, London.

RATHER more than a year ago (vol. xxxiii. p. 361) we reviewed a "Manual of Bacteriology," by Mr. Edgar M. Crookshank. A new edition has now been issued, and the author has increased the value of the work not only by revising it throughout and bringing it up to date, but by recasting the systematic part. He has written new chapters on the general morphology and physiology of Bacteria, on antiseptics and disinfectants, and on immunity; and seventy-three illustrations have been added. He also gives a useful list of references to works on bacteriology.

IN the Annual Report of the Belfast Naturalists' Field Club for the year ended March 31, 1870, it was stated that the Committee considered it advisable that the Club should prepare complete lists of the fauna, flora, geology, and archæology of Ulster. This purpose has been kept steadily in view, and twenty-one separate papers have been issued, illustrated by twenty-seven plates. These papers have now been brought together in what is intended to be the first of a series of volumes. The volume is entitled "Systematic Lists illustrative of the Flora, Fauna, Palæontology, and Archæology of the North of Ireland," and contains the results of much careful and conscientious work. Among the papers is a very useful one by Mr. William Gray on the cromlechs of Antrim and Down. The list is complete, and each of the monuments has been examined by the author, and, as far as possible, measured and sketched. Mr. Charles Elcock contributes notes on the prehistoric monuments at Carrowmore, near Sligo. Both of these papers are accompanied by good illustrations.

A GEOGRAPHY of the Malay Peninsula, Indo-China, the Eastern Archipelago, the Philippines, and New Guinea, by Prof. A. H. Keane, has just been published by Mr. Edward Stanford. The author's primary aim has been to produce a work which may meet the requirements of teacher and pupil in the Straits Settlements, and in the other colonies directly interested in the regions dealt with. The book ought, however, to be of considerable service to students at home. Prof. Keane knows his subject thoroughly, and his treatment of it is in accordance with the methods of the highest authorities on geographical science.

THE Deutsche Seewarte and the Danish Meteorological Institute have just issued the first quarter of a fresh series of daily synoptic charts, commencing with December 1883. The charts show the conditions of weather over the North Atlantic and a part of the adjacent continents, on each morning, from the data collected by both institutions. The period now embraced by the charts is from September 1873 to September 1876, and from December 1880 to February 1884—excepting from September 1882 to August 1883—being part of the thirteen months selected by the Meteorological Council for their synchronous charts; and the whole work forms a valuable contribution to our knowledge of the causes of the weather changes which generally affect this country. A work of a similar nature is being carried out for the Indian Ocean by Dr. Meldrum, of the Mauritius, for the year 1861, but only the charts for the first three months have yet appeared.

THE *Annalen der Hydrographie und maritimen Meteorologie* of Berlin for April last contains the results of observations taken on board the German warship *Habicht* during her stay at Cameroon from April 1885 to September 1886. The maximum temperature in the harbour was 88°·0 in May 1885, and the minimum 71°·2 in June 1885. The amount of rainfall is not stated, but the number of wet days was most frequent between

April and October; the wet season began in June and ended in October. Lightning was observed almost daily, accompanied at times by heavy thunderstorms. Tornadoes were most frequent in June, October, and November. They lasted about fifteen to twenty minutes, and were generally preceded by a threatening bank of clouds rising over the land, accompanied by a heavy downpour lasting for several hours. The tides were irregular; for instance, there was scarcely any tidal current in the harbour in the beginning of October 1886, but only a slight rise of the water, so that often the ship did not swing.

On the night of March 15, at about 8 p.m., a most remarkable display of aurora borealis was observed at Throndhjem, in Norway. It first appeared in the east in the form of a streamer, which suddenly flashed upwards to the zenith, and joined another one shooting up from the west; a perfect and symmetrical arc being thus formed right across the sky, one of the bases of which rested on the horizon at the ridge Stenobjerget, and the other at the fortress of Christiansten. The arc emitted a steady white brilliant light, in the centre of which a nucleus of light appeared, more brilliant still. After remaining perfectly stationary and without any undulating motion along it for about a quarter of an hour, the arc moved slowly a little to the northwards, parallel with its former position. The light then began to be diffused, but the aurora remained in the sky till nearly 10 o'clock, although with less intensity.

Dr. M. A. Veeder writes to us from Lyons, New York, that an aurora was seen there on Saturday evening, April 23. Streamers were numerous and active from 10 to 10.30 p.m. There were magnetic perturbations of marked extent at intervals on Saturday and on Sunday. These perturbations became very decided during the evening of Sunday, when there was again an appearance of the aurora, which was, however, very faint.

Science says that the U.S. Geological Survey proposes to collect all attainable information regarding the recent earthquakes in Arizona. Circular letters of inquiry will be sent to residents on the area affected. The disturbed area seems to be a circle of some 400 miles radius, fully one-quarter as large as the Charleston earthquake, and nearly one-third of the area of the Riviera earthquake of last February.

A paper by Prof. Milne, containing an interesting account of a series of observations made upon earthquakes in Tokio between March 1884 and March 1885, has lately been printed. Prof. Milne arrives at the practical conclusion that there are at least three ways in which an ordinary building may be to a considerable extent protected from earthquake motion. The first method in a given district is, he says, to make a seismic survey of that area, and then select the locality where the least motion is experienced. A second method is to rest the building at each of its piers upon layers of cast-iron shot. A third method, which is applicable to heavy structures of stone or brick, is to allow them to rest upon foundations on hard ground rising from a deep pit or series of trenches.

At a meeting of the Council of the National Fish-Culture Association, on Thursday last, a resolution approving of the proposed North Sea Fisheries Institute was unanimously carried. At the same meeting the Secretary reported that a large quantity of trout fry had been presented to various public waters in London and the provinces by the Association. The rest of the fish hatched out this season had been deposited in ponds at the Delaford Park establishment, the aim of the Association being to raise fish entirely from the ova taken from stock bred therein, not from eggs obtained from outside sources. He further stated that the rainbow-trout of California, bred by the Association, had all been maliciously poisoned by arsenic. A severe loss had thus been sustained, the fish being very valuable.

Another establishment for fish-culture has just been formed at Dulverton, in Somersetshire, by Mr. Frank Langdon. A series of ponds has been made near a tributary of the Exe, which affords an ample supply of pure water. Trout culture will constitute the chief business of the establishment, and a hatchery is being erected to receive the ova, which will be laid down for incubation at the end of the present year.

A *soirée* will be given at University College by the University College Biological Society on Monday, June 6, when Prof. Moseley, F.R.S., will lecture on "Life on the Ocean Surface." Cards of invitation will be sent on application to the Secretary, Mr. Bruce G. Seton.

M. E. Quinquaud has been investigating the influence of baths on the chemical phenomena of respiration and nutrition. He finds, by experiments on dogs, that cold baths increase the consumption of oxygen, the consumption being on the average ten times more abundant after the bath than before. Very hot baths exert a like influence, but in a less marked manner. Cold baths (and hot as well, but in a less degree) increase pulmonary ventilation: the quantity of air passed through the lungs is double or treble after the bath. At the same time a greater quantity of carbonic acid is expelled. By the analysis of arterial and venous blood it is shown that the respiratory combustions are very much increased under the influence of cold or hot baths, and it is also shown that the production of blood sugar is greater.

Dr. T. Mitchell Prudden, of New York, has been making some important experiments with a view to determining the effect of freezing on Bacteria. In the case of the *Bacillus prodigiosus*, there were 6300 Bacteria in a cubic centimetre of water before freezing; after being frozen 4 days, 2970; after 37 days, 22; and none after 51 days. Of the *Staphylococcus pyogenes aureus*, there were a countless number before freezing; after 18 days of freezing, 224,598; after 54 days, 34,320; and after 66 days, 49,280. Of the typhoid-fever Bacillus, innumerable before freezing; 1,019,403 after being frozen 11 days; 336,457 after 27 days; 89,796 after 42 days; and 7348 after 103 days. These facts show that certain Bacteria have a remarkable power of resisting the temperature at which ice forms. Dr. Prudden, therefore, recommends that the New York State Board of Health, or other authority, should have power to determine which, if any, of the sources of ice-supply are so situated as to imperil the health of consumers of ice.

An important new reaction is described in the current issue of the *Comptes rendus* by MM. Varet and Vienne. A current of acetylene was passed through 200 grammes of benzene containing 50 grammes of aluminium chloride during 30 hours, and the oily liquid remaining after removal by washing of the unaltered aluminium chloride was found to yield, on fractional distillation, three distinct products. The first, which came over between 143° and 145°, and which amounted to 80 per cent. of the whole, consisted of pure cinnamene or styrolene, $C_6H_5\text{—}CH = CH_2$, a substance occurring in liquid storax (*Liquidambar orientale*), and which was synthetized by M. Berthelot by passing acetylene together with benzene vapour through a tube heated to redness. The second fraction, coming over at 265°-270°, consisted of diphenyl ethane $(C_6H_5)_2 = CH\text{—}CH_3$, and the third fraction, boiling at 280°-286°, was found to consist entirely of dibenzyl, $C_6H_5\text{—}CH_2\text{—}CH_2\text{—}C_6H_5$, a solid substance isomeric with diphenyl ethane. These syntheses are extremely interesting, and afford another instance of the singular action of aluminium chloride in enabling us to attack the benzene nucleus.

A CURIOUS series of experiments has just been completed by Drs. Emil Fischer and Penzoldt (*Liebig's Annalen*, B. 239, i. 131) upon the sensitiveness of the sense of smell. These chemists used mercaptan and chlorphenol as their odoriferous substances, and experimented in a room of 230 cubic metres capacity. A gramme of the substance was dissolved in a litre of alcohol; 5 c.c. of the solution were again diluted to a known volume, and 1-3 c.c. of the latter solution measured out into a flask from which a fine jet could be directed by the experimenter to all parts of the room, the air of which was subsequently agitated by the waving of a flag. At a given signal a second experimenter stepped into the room, and took his olfactory observation, which was checked by the independent observation of a third person. The astonishing result was arrived at that our olfactory nerves are capable of detecting the 1/4,600,000 part of a milligramme of chlorphenol and the 1/460,000,000 part of a milligramme of mercaptan. The quantity of mercaptan present in the air of the room was 250 times less than the amount of sodium present in the air of the room in which Bunsen and Kirchhoff made their experiments upon the sensitiveness of the spectroscope, when the sodium lines were just perceptible.

IN our note last week (p. 64) on Mr. Carey Lee's paper in the *American Journal of Science*, for "protochloride" read "photochloride."

THE additions to the Zoological Society's Gardens during the past week include a Brown Capuchin (*Cebus fatuellus*) from Guiana, presented by Mr. George Doddrell; a Rhesus Monkey (*Macacus rhesus*) from India, presented by Mrs. Livingstone; a Common Marmoset (*Hapale jacchus*) from South America, presented by Mr. J. H. Hallett; a Ring-tailed Coati (*Nasua rufa*) from South America, presented by Mr. Robert R. MacIver; a Brown Bear (*Ursus arctos*) from Russia, presented by Mr. John Rhind; a Grey Ichneumon (*Herpestes griseus*) from India, presented by Mr. J. W. Deacon; a Bare-eyed Cockatoo (*Cacatua gymnopis*) from South Australia, presented by Sir Nathaniel Barnaby; two Daubenton's Curassows (*Crax daubentoni* ♂ ♀) from Venezuela, presented by Mr. F. G. Thompson; two Madagascar Porphyrios (*Porphyrio madagascariensis*) from Mozambique, presented by Capt. J. C. Robinson, s.s. *Roslin Castle*; a Western Slender-billed Cockatoo (*Licmetis pastinator*) from West Australia, presented by Miss Streeter; a Horse-shoe Snake (*Zamenis hippocrepis*); an Ocellated Sand Skink (*Seps ocellatus*) from Tripoli, North Africa, presented by Mr. George Russell; two Hawk's-billed Turtles (*Chelone imbricata*) from the East Indies, presented by Mr. J. A. Wilson; a Collared Fruit Bat (*Cynonycteris collaris*) born in the Gardens.

OUR ASTRONOMICAL COLUMN.

PHOTOGRAPHY THE SERVANT OF ASTRONOMY.—As an instance of the ease with which relative motions of stars can be detected by the aid of photography may be cited the case to which attention is drawn by M. de Gothard in *Astronomische Nachrichten*, No. 2777. On examining a photograph of the cluster G. C. 4440, taken at the Hérény Observatory in 1886, M. de Gothard found that a small star of the eleventh magnitude had changed its position relatively to the other stars in its neighbourhood by a considerable amount since the date of Herr Vogel's measurements of the relative positions of several of the components of this cluster executed with the Leipzig equatorial in 1867–69. The star in question is No. 48 of Herr Vogel's list, and it appears to have a proper motion of 2″·3 per annum. No. 46 of the same list appears also to have changed its position.

A NEW MINOR PLANET.—No. 266, if, as it would appear, Dr. Luther's discovery of April 11 be really Hesperia, was discovered by Herr Palisa, at Vienna, at midnight on May 17; magnitude 12.

COMET 1887 *e* (BARNARD, 1887 MAY 12).—Dr. E. Lamp supplies the following elements and ephemeris for this object (*Astr. Nach.* No. 2786) from observations obtained at Cambridge, Mass., on May 12, and at Kiel on May 14 and 16:—

$$T = 1887 \text{ June } 18{\cdot}85945 \text{ Berlin M.T.}$$

$$\left.\begin{array}{l} \omega = 17^\circ\ 24'{\cdot}50 \\ \Omega = 245\ \ \ 8{\cdot}81 \\ \iota = 17\ \ 31{\cdot}09 \end{array}\right\} \text{Mean Eq. } 1887{\cdot}0.$$

$$\log q\ 0{\cdot}13822$$

Ephemeris for Berlin Midnight.

1887.	R.A. h. m. s.	Decl. ° ′	Log *r*.	Log Δ.	Brightness.
May 28	15 39 11	20 20·6 S.	0·1492	9·6024	1·54
30	15 43 19	18 45·8			
June 1	15 47 35	17 8·6	0·1456	9·5919	1·64
3	15 51 56	15 29·8			
5	15 56 22	13 50·1 S.	0·1426	9·5854	1·72

The brightness on May 12 is taken as unity. Dr. Lamp describes the comet as being faint and round on May 14, and as showing a nucleus.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1887 MAY 29—JUNE 4.

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on May 29.

Sun rises, 3h. 53m.; souths, 11h. 57m. 6·9s.; sets, 20h. 1m.; decl. on meridian, 21° 37′ N.: Sidereal Time at Sunset, 12h. 29m.

Moon (at First Quarter on May 30) rises, 10h. 30m.; souths, 17h. 48m.; sets, 0h. 56m.*; decl. on meridian, 11° 40′ N.

Planet.	Rises. h. m.	Souths. h. m.	Sets. h. m.	Decl. on meridian. ° ′
Mercury	3 55	12 7	20 19	22 49 N.
Venus	6 30	14 54	23 18	24 26 N.
Mars	3 28	11 22	19 16	20 9 N.
Jupiter	15 55	21 13	2 31*	9 3 S.
Saturn	6 53	14 59	23 5	22 2 N.

* Indicates that the setting is that of the following morning.

Occultations of Stars by the Moon (visible at Greenwich).

May.	Star.	Mag.	Disap. h. m.	Reap. h. m.	Corresponding angles from vertex to right for inverted image. ° °
29	45 Leonis	6	20 37	21 34	69 314
29	ρ Leonis	4	23 10	0 2†	88 311
30	σ Leonis	4	19 46	20 6	152 188
June.					
2	94 Virginis	6	20 29	20 39	335 319
4	49 Libræ	5½	19 55	20 30	345 284

† Occurs on the following morning.

May.	h.	
29	2	Mercury at least distance from the Sun.
30	17	Venus in conjunction with and 2° 15′ north of Saturn.
June.	h.	
2	12	Jupiter in conjunction with and 3° 22′ south of the Moon.

Variable Stars.

Star.	R.A. h. m.	Decl. ° ′		h. m.	
U Cephei	0 52·3	81 16 N.	May 29,	1 57	*m*
			June 3,	1 37	*m*
δ Libræ	14 54·9	8 4 S.	,, 4,	2 18	*m*
U Coronæ	15 13·6	32 4 N.	,, 1,	2 6	*m*
W Herculis	16 31·2	37 34 N.	,, 4,		*M*
U Ophiuchi	17 10·8	1 20 N.	May 30,	2 34	*m*
			and at intervals of	20 8	
U Sagittarii	18 25·2	19 12 S.	May 29,	2 0	*m*
			June 1,	1 0	*M*
β Lyræ	18 45·9	33 14 N.	May 31,	23 0	m_2
R Lyræ	18 51·9	43 48 N.	,, 31,		*M*
S Aquilæ	20 6·4	15 17 N.	,, 29,		*m*
δ Cephei	22 25·0	57 50 N.	June 2,	3 0	*M*

M signifies maximum; *m* minimum; m_2 secondary minimum.